

## **ADAPTABLE MOUNTING SYSTEM FOR FLAT PANEL DISPLAY**

### **RELATED APPLICATIONS**

5           This application claims the benefit of U.S. Provisional Patent Application No. 60/462,158, filed April 11, 2003, the same being hereby fully incorporated herein by reference.

### **FIELD OF THE INVENTION**

10           This invention relates to mounting flat panel displays to fixed structures, and particularly to adaptable mounting systems for mounting a flat panel display to fixed structures having a variety of possible configurations.

### **BACKGROUND OF THE INVENTION**

15           Electronic displays, such as flat panel monitors and televisions, are often used at public gatherings, such as trade-shows and the like, to display information to groups of people. Often in such settings, a portable structure will be used to form a booth or kiosk to contain an exhibit for displaying information in an organized fashion. Display systems including such portable structures generally include an open framework of elongate members that may be covered with fabric, graphic displays or other materials. These display systems are available from a  
20           multiplicity of different manufacturers and come in a myriad of shapes, sizes and configurations.

          Flat panel displays are fragile and it is accordingly desirable to protect them from contact by people and foreign objects when they are used in a public setting. Also, such displays are expensive, and accordingly present an attractive target for theft unless they are secured to a

structure. Additionally, it may be desirable to elevate a flat panel display when used in a public setting so as to provide maximum visibility.

For all of these reasons, it may be desirable to attach a flat panel display to a portable structure such as may be used for a booth or kiosk. Due to the extremely wide variety and number of commercially available display framework structures, however, a multiplicity of different mounting devices have been employed in the past to mount a flat panel display device to such structures. Essentially, a unique mounting bracket has been needed for each structure, which may have members with varying cross-sectional shapes, sizes, and spacings. This has led to a lack of flexibility and increased expense.

What is needed in the industry is an adaptable mounting system for mounting a flat panel display to elongate members of a framework, where the system is usable with a wide variety of structure configurations.

### SUMMARY OF THE INVENTION

The present invention is an adaptable mounting system for a flat panel display that substantially meets the needs of the industry. The mounting system includes a clamp that is adaptable so as to clamp to the elongate members of a framework, where the members may have any of a wide variety of cross-sectional shapes, sizes, and spacings.

An adaptable mounting system for attaching a flat panel display device to an elongate member of a framework includes a display interface operably coupleable to the flat panel display device. The display interface has a portion adapted to engage an elongate member. A draw clamp portion opposes the display interface, and is arranged so that the elongate member is

positionable between the draw clamp portion and the display interface. The draw clamp portion has at least one member engaging portion for engaging the elongate member. The member engaging portion has a pair of flat regions with an arcuate shaped region between the flat regions. A pair of selectively adjustable biasing elements, which may be threaded fasteners, are positioned so as to apply a biasing force drawing the draw clamp portion toward the display interface, thereby clamping the display interface and the draw clamp portion to the elongate member.

In another embodiment, an adaptable mounting system for attaching a flat panel display to an elongate member of a framework includes a display interface operably coupleable to the flat panel display device, and a generally u-shaped draw clamp. The display interface has at least one arcuate shaped region adapted to engage the elongate member. The draw clamp has a pair of spaced apart side portions and is arranged so that the elongate member is positionable between the spaced apart side portions when the elongate member is engaged with the arcuate shaped region. At least one threaded fastener is arranged so as to draw the draw clamp portion toward the display interface when the fastener is tightened, thereby clamping the display interface and the draw clamp portion to the elongate member.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an adaptable mounting system according to the present invention in use to mount a flat panel display to a framework;

Fig. 2 is a perspective view of a draw clamp according to the present invention;

Fig. 3 is a fragmentary perspective view of an adaptable mounting system attached to a framework;

Fig. 3A is fragmentary perspective view of an adaptable mounting system attached to a framework of members, each having a square cross-section;

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Fig. 4 is a top plan view of a portion of the adaptable mounting system attached to an elongate member;

Fig. 5 is a perspective view of an alternative embodiment of an adaptable mounting system attached to an elongate member;

10 Fig. 6 is an exploded view of the adaptable mounting system embodiment of Fig. 5;

Fig. 7 is a front perspective view of the adaptable mounting system embodiment of Fig. 5;

Fig. 8 is a rear perspective view of the adaptable mounting system embodiment of Fig. 5;

15 Fig. 9 is a top plan view of the alternative embodiment of Fig. 5 depicting the system engaged with elongate members of a variety of sizes depicted in phantom lines; and

Fig. 10 is a cross-sectional view of an alternative embodiment of an adaptable mounting system, with phantom lines depicting elongate members of a variety of sizes and the corresponding configuration of the mounting system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An adaptable mounting system 20 for mounting a flat panel display 22 to a framework 24, which includes one or more elongate members 26, is depicted in Figs. 1-4. Adaptable mounting system 20 generally includes a display interface 28 and a draw clamp 30.

5        Display interface 28 generally includes body portion 32, channels 34, and display mounting bracket 36. Display mounting bracket 36 may be pivotally attached to body portion 32 at pivots 38 to provide a tilt adjustment for flat panel display 22. Edges 39 of channels 34 confront and engage the elongate members 26. Channels 34 are attached to body portion 32 as will be further explained herein below.

10        Draw clamp 30 includes a web portion 40 and a pair of generally parallel side portions 42. A cutout region 44 exposes a member engaging region 46 on each side portion 42 as depicted best in Fig. 2. Each member engaging region 46 has a pair of flat regions 48 arranged on each side of an arcuate shaped region 50. Bores 52 are formed in web portion 40 on either side of cutout region 44, and extend through bosses 54 on the underside 56 or web portions 40.

15        Bores 52 may have threads 58 for receiving a threaded fastener 60.

Adaptable mounting system 20 may be attached to one or more elongate members 26 of a framework 24 as depicted in Fig. 3. Threaded fasteners 60 extend through slots 62 in body portion 32, slots 64 in channels 34, and thread into bores 52 in draw clamp 30. Edges 39 of channel 34 confronts each elongate member 26 on one side of the member, while member engaging region 46 of draw clamp 30 confronts the elongate member 26 on the opposite side of the member. As threaded fasteners 60 are tightened, channels 34 and draw clamp 30 are biased together and toward the elongate member 26. Thus, elongate members 26 are clamped between

channels 34 and each draw clamp 30, thereby securing adaptable mounting system 20 to framework 24.

As depicted in Fig. 4, draw clamp 30 is adaptable to elongate members 26 having a variety of cross-sectional shapes. Generally cylindrical members 66 are engagable with arcuate shaped region 50, while square or rectangular members 68 are engagable with flat regions 48. Adaptable mounting system 20 is depicted in Fig. 3A attached to square members 68. Of course, it will be appreciated that an elongate member of any other polygonal shape is engagable as well so long as the member will fit between channels 34 and draw clamp 30 and between threaded fasteners 60. Accordingly, it will also be appreciated that the present invention is adaptable for use with elongate members 26 having a wide range of diameters and cross-sectional dimensions.

In addition, fasteners 60 are laterally positionable in slots 62 of body portion 32 and slots 64 in channels 34, enabling adaptable mounting system 20 to accommodate a range of spacing dimensions, annotated "W" in Fig. 1, between elongate members 26. Further adaptability may be added with slots 70 in body portion 32. By turning body portion 32 by 90 degrees and fastening body portion 32 to channels 34 through slots 70 rather than slots 62, a 90 degree change in orientation of flat panel display 22 may be made, for the purpose of mounting to a horizontal framework member or for an alternative flat panel display screen orientation when mounted on a vertical member.

It will, of course, also be readily appreciated that a variety of other arrangements and mechanisms may be used in place of threaded fasteners 60 to bias draw clamp 30 and channels 34 towards each other and into the elongate member 34. For example, one or more "c" clamp arrangements may be disposed so as to engage draw clamp 30 and channel 34 and be arranged so

as to exert the desired biasing force to clamp the elongate member 26 between draw clamp 30 and channel 34. In short, any suitable method for exerting the required biasing force may be used and is included in the scope of the present invention.

Another embodiment of an adaptable mounting system 72 for attaching a flat panel display to a single elongate member 26 is depicted in Figs. 5-10. Mounting system 72 generally includes display interface 74 and draw clamp 76.

Display interface 74 generally includes a member engaging portion 78 and a display engaging portion 80. Member engaging portion 78 has a back 82, a pair of sides 84 and a pair of ends 86. Each end 86 has an arcuate shaped cutout region 88 with an edge 90 for engaging an elongate member 26. Sides 84 have threaded apertures 92 for receiving threaded fasteners 94, 95. Back 82 has apertures 96 for receiving threaded fasteners 98.

Display engaging portion 80 has a planar portion 100 and a pair of flanges 102 spaced apart so as to accept member engaging portion 78 therebetween. Each flange 102 has an aperture 104 and a curved slot 106. Threaded fastener 95 extends through aperture 104 and threaded into one threaded aperture 92 in member engaging portion 78, while threaded fastener 94 extends through curved slot 106 and threads into the other threaded aperture 92. Display engaging portion 80 is thus pivotable about threaded fastener 95 with respect to member engaging portion 78.

Planar portion 100 has notches 108 for engaging fastening buttons 110 attached to a flat panel display device 22. Latching flag 112 may be provided on planar portion 100 to secure the connection. Further details concerning the connection and fastening buttons 110 are contained in co-pending U.S. utility application serial number \_\_\_\_\_, entitled "FLAT PANEL DISPLAY

MOUNTING SYSTEM” which claims the benefit of U.S. Provisional Patent Application No. 60/462,411 having the same title, said applications commonly owned by the owners of the present invention and each of which is fully incorporated herein by reference.

Draw clamp 76 has a generally u-shaped body portion 113 with a pair of sides 114. The  
5 ends 116 of each side 114 are turned inwardly. End bar 118 spans ends 116, and has tabs 120, which fit into apertures 122 in side 114, thereby securing end bar 118 in place. End bar 118 further has threaded apertures 124 aligned with apertures 126 in body portion 113. Threaded fasteners 98 with washers 128 extend through apertures 96 and apertures 126, and thread into apertures 124. Bottom edges 130 of sides 114 ride on inner surface 132 of one end 86 of  
10 member engaging portion 78, while the top edges 134 confront inner surface 136 of the other end 86. Draw clamp 76 is thus slidably movable between ends 86 by threading and unthreading fasteners 98.

In operation, an elongate member 26 may be positioned between draw clamp 76 and member engaging portion 78. Threaded fasteners 98 are then tightened, moving draw clamp 76  
15 inwardly toward member engaging portion 78. Fasteners 98 may be tightened until the elongate member 26 is securely held between the inner surface 138 of draw clamp 76 and edges 90 of member engaging portion 78.

As depicted in Fig. 9, mounting system 72 is adjustable for elongate members of various sizes within the range of travel of member engaging portion 78 on threaded fasteners 98. In  
20 addition, although only round elongate members are depicted, that mounting system 72 is usable with members having an oval, rounded or polygonal cross section.



In the alternative embodiment of mounting system 72 depicted in Fig. 10, a one-piece draw clamp 140 replaces draw clamp 76. In this embodiment, a single fastener 142 may be used to tighten and loosen the clamp.